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ABSTRACT

A qualitative longitudinal study, first of four parts, compared developmental movement levels and academic learning levels in young children. Subjects were 28 children of various ages who were not working up to grade level but who did not qualify for learning disability services. Parents completed a detailed demographic survey and a neurological organization evaluation form. Children were videotaped at 6-month intervals over 5 years as they performed locomotor, manipulative, and nonlocomotor skills. Results indicated a parallel between the difficulty in mastering locomotor, manipulative, and nonlocomotor movements, academic learning at grade level, and demographic data. Academic classroom teachers should notice whether children are "toe-walkers"; walk up stairs one step at a time; can hop on one foot and change to the other foot with good balance; can walk forward, backward, and sideward; can crawl up on their hands and knees for a distance; and jump sidewards with two feet together over a rope lying on the floor. Teachers can use a variety of activities that get children moving and have fun. Teachers can also help children develop manipulative skills that involve developmental hand dominance processes and developmental eye dominance processes as well as exercising the brain and nervous system throughout the day. Further research needs to examine the development of these children's nervous systems. (Contains 21 references and a synopsis of the other 3 parts of the study.) (RS)

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Children who desperately want to read, but are not working at grade level: Use movement patterns as "windows" to discover why.

Part I

This is part one of a four part discussion of a longitudinal study comparing developmental movement levels and academic learning levels in young children.

There are some children in every preschool and primary classroom who desperately want to learn to read and write, but they are not working up to grade level. They do not qualify for learning disability services. There is no medical or prenatal explanation. They have loving, supportive parents. They are a "mystery" and a "worry" to conscientious parents and teachers.

This longitudinal study followed developmental levels of twenty-eight children of various ages for approximately five years.

A qualitative method of research was used in this study to identify the developmental levels of the children. The children were identified by their classroom teachers, physical education teacher, and parents as children who desperately wanted to learn to read and write, but were not working up to "grade level."

The parents completed a detailed demographic survey which could be completed from the children's baby books. The parents, also, performed the Delacato and Delacato Consultants in Learning Neurological Organization Evaluation Form on the children at home.

The children were video-taped on a six month interval performing locomotor, manipulative, and nonlocomotor skills. At the same time the

classroom teachers supplied a copy of the children's report card and/or a progress report, and a writing or drawing paper sample.

The demographic surveys were reviewed and similarities were recorded. The Neurological Organization Evaluation forms were reviewed and similarities were recorded.

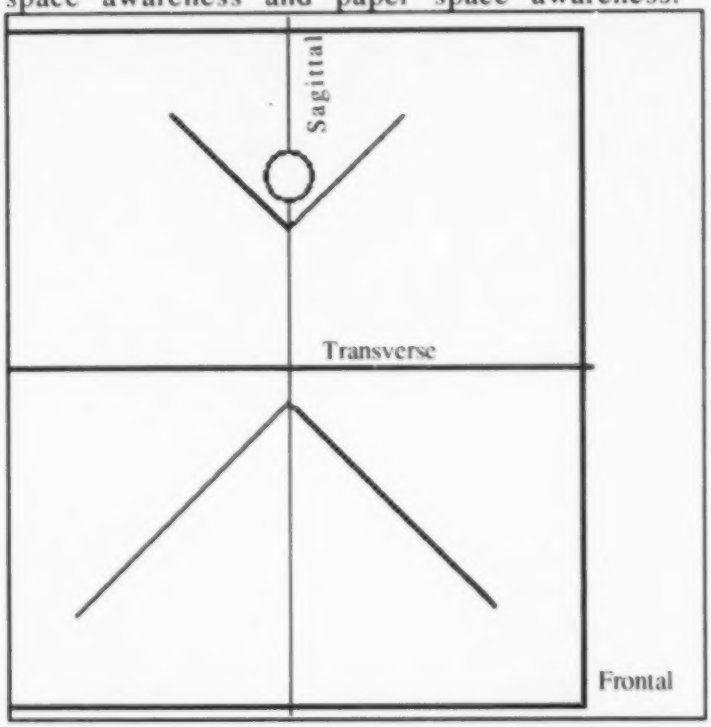
The video-tapes of the children's locomotor, manipulative, and nonlocomotor skills were evaluated by the physical education teacher and a prescriptive analysis was written based on David Gallahue's (1993) Developmental Physical Education for Today's Elementary Children. Gallahue describes the developmental motor skills and labels the descriptors as initial, intermediate, and mastered skill levels.

The classroom teacher's report card or progress reports listed the children's reading, writing, spelling, and math learning levels as at, above, or below grade level. Some of the primary classroom teachers evaluated the students on a continuum.

The writing and/or drawing samples supplied by the parents and by the classroom teachers were evaluated by the physical education teacher simply for the use of paper-space. The "paper-space" use was compared to the prescriptive analysis of the children's movement "body-space" use. To ensure equal concentration and evaluation of both paper-space awareness and body-space awareness, three midlines were identified: (1) the sagittal midline which divides the body and the paper into right and left sections; (2) the transverse midline which divides the body and the paper into top and bottom sections; and (3) the frontal midline which divided the body and paper into front and back.

The Three Midlines

The same imaginary lines can be used to determine a child's body-space awareness and paper space awareness.



At this point the researcher made the decision to use the three midlines as themes into which all the data collected from the parents, classroom teachers, and physical educator would be entered.

Another decision was made to include siblings of the identified participants. This decision was made because of the difficulty in finding parents who are willing to allow their children to become part of a research study and because of the legal and ethical documentation required when working with young children.

Therefore, the number of children involved in the study for all or for part of the time was 28 and the number of families involved were 17. Some of the children were newborn siblings who were included for two or three years and their demographic survey of skill development was

compared to the other participants. When the children finished the fifth grade and went to the middle school, their data folders were closed.

A third decision was made to interpret the findings only in documented neurophysiological terms.

The Academic Classroom

Academic learning traditionally uses the sensory pathways of the brain and nervous system to expose children to knowledge. The knowledge is stored in the brain. Learning this knowledge is then considered mastered when the child can reproduce the knowledge through the small muscle movements used in reading, writing, or by verbally communicating some indication that the knowledge has been learned and understood. As these motor patterns become automatic the child is considered to be learning to read, write, spell, and do math at her highest potential.

A problem occurs when the child can not communicate through fine motor skills (reading, writing, or verbally) that the knowledge has been learned. Is the knowledge stored in the brain but the motor neurons are not developed enough to allow the child's fine motor skills to communicate the knowledge? Or are the two hemispheres of the brain not communicating efficiently?

The Physical Education Classroom

The relationship between movement education and academic education is based on the assumption that both realms of learning are dependent on the adequate development of the brain and nervous system.

The development of the brain and nervous system reaches mature motor patterns through use. Large muscle motor patterns that we teach in physical education classes help develop the brain and nervous system

through the myelination process and by increasing the number of dendrites on the neurons.

The logical process to developing the physiology of the brain and nervous system is to start with large muscles (walk, run, throw, etc.), and continually develop and fine tune the small muscles (writing, reading, etc.).

The Sagittal Midline

1. The sagittal midline divides the body into right and left sides. The left hemisphere of the brain controls the right side of the body. The right hemisphere of the brain controls the left side of the body.

Physiology of the brain

Brain growth is about 75% complete by age three and nearly 90% by age six (Gallahue, 1993).

Physical educators are taught that below the neck level the right hemisphere of the brain controls the left side of the body and the left hemisphere of the brain controls the right side of the body. So for physical educators to teach a child to walk, run, skip, throw, strike, catch, etc., the two hemispheres of the brain need to communicate to each other to coordinate the mature motor pattern.

The corpus callosum and anterior commissure are the only two places in the brain's anatomy that the right and left hemispheres of the brain can communicate to each other. As the teachers teach children to develop mature motor patterns, we are developing the motor and sensory neuron pathways of the corpus callosum and the anterior commissure.

Academic classroom teachers are not exposed to the anatomy of the brain and nervous system. They see physical education as planning time and an opportunity for the children to run off excess energy. Classroom teachers and administrators need to be taught that physical educators exercise the child's brain and nervous system as well as the muscular system.

Anatomy of the eye

In assuming that above the neck the right hemisphere of the brain controls the right side of the body and vice versa, we have overlooked the fact that the optic nerve from each eye divides into two branches. The lateral branch remains on the same side of the brain hemisphere, but the medial branch of each eye's optic nerve crosses over to the opposite hemisphere of the brain. Therefore, half of what is seen by each eye is stored in the opposite brain hemisphere and must pass through the corpus callosum and/or the anterior commissure to be coordinated by the dominant hemisphere of the brain, i.e., written, read or spoken.

Use it or lose it Furthermore, each eye has six muscles that need to be exercised to develop motor patterns before visual tracking reaches mature motor patterns. To the classroom teacher visual tracking means that a child can visually track a sentence from left to right and then right to left to reset and to track from top to bottom. To the physical educator we recognize visual tracking skills in throwing to a target, catching, striking, moving to a ball, etc., (large muscle motor patterns). If a child is not visually tracking objects in the gym, it is almost certain that he can not track the written word (small muscle motor patterns) in the academic classroom.

Dominance

What happens when a child's dominant hand when writing is not his dominant hand for other manipulative skills? For instance, one hemisphere of the brain is dominant for writing and the other hemisphere is dominant for cutting, throwing, etc.

It appears that this mixed dominance is manifested by neither or both brain hemispheres trying to act on a command. It is like two people leaving for work in the morning, both knowing they need a loaf of bread but not definitely delegating who will stop and buy the loaf of bread. They either come home at night with two loaves of bread or no bread with each person thinking that the other person was going to take on the responsibility.

Is it possible that the same process happens if a child's dominant eye is the right hemisphere of the brain and her dominant hand is the left hemisphere of the brain? In this study, mixed eye/hand dominance seemed to affect the comprehension skills of what the child has read or written by the third or fourth grade. The classroom teacher sees these children as fluent readers or emergent readers, but are frustrated by the fact that the child cannot tell her what he has just read or written.

Some children compensate and appear to be learning academics at grade level. Other children have high frustration levels in accepted reading and reading comprehension tests. Could it be the information is stored in different hemispheres of the brain and the child can not retrieve it because of an immature development level of the corpus callosum and/or the anterior commissure?

Other researchers have documented the same right/left hemisphere[8] communication problems and documented reading difficulty. Dennison (1981):

> Research shows that different brain functions reside in different parts of the brain. In order to read, a person must use the left side of the brain to sound out words and analyze thoughts, he also must use the right side of the brain to remember sight words and visualize what the author is describing.
>
> Brain research proves that certain kinds of physical activity help the two sides of the brain work together simultaneously.
>
> A surprising 75% of students with diagnosed learning difficulties never crawled.

Heller (1990) states, " Higher functioning, especially achievement of the highest order, emerges from an interplay of left and right brain, of verbal and spatial, analytic and synthetic, accomplished through constant communication across the corpus callosum."

The parallel

In this study, by compiling the results of the demographic data and the Neurological Organization forms completed by the parents, the developmental skill levels recorded on video-tape by the physical educator, and the progress report cards completed by the classroom teachers a parallel was documented.

Clearly, there was a parallel between the difficulty in mastering locomotor, manipulative, and non locomotor movements involving the right and left hemispheres of the brain, academic learning at grade level, and the demographic data.

(1) Many of the children who were targeted for this study, did not use crawling up on their hands and knees as a major mode of

transportation. Others, who did use crawling as a major mode of transportation, crawled at 18 to 22 months.

This study concludes that crawling up on the hands and knees (creeping) is the first brain and nervous system use that develops the myelination process of the sensory and motor neurons and the corpus callosum. It is the first movement skill that requires coordinating the right and left side of the body in a mode "transportation". It is the first developmental process for coordinating the eyes to focus together at an arm's length as when reading. Crawling is, also, the first major opportunity for the ears to learn to hear in stereo.

These findings concur with the many research studies of Delacato from the 1970s to the present. Dennison (1981) states also that in children with delayed learning, a process of re-teaching fundamental movement skills (i.e., creeping), has been successful.

(2) The targeted participants had not mastered walking in a mature motor pattern. Most children did not have a good heel-to-toe strike. They also had trouble walking up and downstairs alternating feet on each step.

Delacato (1992) questions, "It had been assumed that a healthy brain made it possible to walk, but could it be that the process of going through developmental movement stages toward walking is what creates a complete and intact brain?"

(3) Most of the targeted children confused galloping and skipping. It was difficult for them to step, hop, step, hop in a skipping pattern with good balance and control.

(4) The children had balance problems on at least one foot while hopping and had difficulty keeping the opposite leg down and back. An

immature motor pattern in hopping is holding the opposite knee or foot in front. The participants were not allowed to hold the opposite leg.

(5) When jumping for distance, the children had balance problems upon landing.

(6) When jogging or running, the children did not show a flight pattern. Therefore, they were actually performing a very fast walk which looked very smooth and controlled. There was, however, no time when both feet were off the floor as in a mature running pattern.

(7) The children could not leap over an imaginary mud puddle with good balance. Leaping is taking off with one foot and landing on the other foot.

(8) When asked to slide sideward in a step-together-step pattern, the children moved very slowly even if encouraged to go much faster. The direction to one side (right or left) seemed more difficult than the other side.

At the same time the classroom teachers were reporting the children working below grade level in reading, spelling, writing, and/or math. The teachers emphasized the great amount of effort the children put into their work.

Writing samples that were evaluated at the same time, but only in use of paper-space, showed that the targeted children used the vertical center of the paper space. Some children wrote down the vertical center of the paper without an attempt to write from the left hand margin to the right hand margin or from the top to the bottom. Other children drew pictures in the vertical space with little or no acknowledgment of the upper or lower corners of the paper.

What should academic classroom teachers look for? -- I

Remember that this study targeted only children who had learning delays that could not be attributed to any prenatal or genetic cause. These children did not qualify to special education services. Furthermore, their parents and siblings are very supportive of the school, teachers, and the learning process. These children made up approximately 1%-2% of an academic classroom and were truly a mystery to the teacher and their parents.

According to Spock and Rothenberg (1992), "Developmental stages are dependent on individual characteristics, temperament, and an individualized 'blue print' of developmental readiness. Before the children have the coordination to succeed, they want to try."

Gallahue (1993) concurs that research shows each person has a "sensitive learning period" in which learning is mastered in a more efficient manner.

- You can not hurry this developmental process.
- You can expose a person to learning environments that are conducive to and safe for exploration and learning.
- You can delay learning by withholding exploration and learning environments during the individual's "sensitive learning period".
- If a person does not learn a skill during a "sensitive learning period," he can learn the skill later with remedial help or he can compensate for the void.

Locomotor skills

An academic classroom teacher can observe children best from walking at the end of the line rather than always walking at the front of the line.

(1) Is the child a toe-walker? A child who has spent much time in a baby walker, etc., will develop the calves of her legs. When she begins to walk, her buttocks and hamstring muscles are used. If a child continues to

walk on her "toes" (balls of the feet), it is because her calves and Achilles[12] tendons are too tight.

These children have balance problems because as they try to walk, run, hop, jump, skip, etc., they continually try to land on the ball of their feet, in contrast to using their entire foot.

The teacher should encourage these children to use stretching exercises to lengthen the lower leg muscles and tendons. Good stretching exercises would be to stand on the edge of a step and lowering heels below step and raising up to the toes repeated 10 or 12 times, then turning toes out and repeating the exercise, then toeing in and repeating the exercise. Another good exercise is to walk on their heels with the toes pointed up in the air.

(2) Does the child walk up the stairs or the steps of a sliding board one step at a time with the same leg leading each time? When children master climbing stairs they will alternate legs on each step and not put both feet on the same step.

Children will master climbing stairs before they master descending stairs. Remember to provide a safe environment because a confident child will always jump off the last two steps and will always try to walk up a sliding board. These are developmentally appropriate progressions that require a safe environment and active supervision.

(3) Can a child hop on one foot and change to the other foot with good balance? Do not expect a child to skip if he can not hop on one foot. Structured lessons on hopscotch are excellent ways to encourage the development of crossing the sagittal midline while hopping on one foot and while jumping on two feet.

(4) Can a child walk forward, backward, and sideward? A sideward walk is a grapevine step where the child steps behind one leg, beside with the other foot, in front with the other foot, and repeating, beside, behind, in front, etc., to the right and then to the left. All locomotor skills should be practiced forward, backward, and sideward. Yes, even hopscotch can be practiced forward, backward, and sideward.

(5) Can a child crawl up on his hands and knees efficiently for a distance? If not, have the children pretend to be animals that use four legs to move. I think that children are in a hurry to get up and walk because significant adults stand up and walk continuously. If a person spends time with children playing on his hands and knees, children enjoy the experience and practice crawling longer.

(6) Can the child jump sidewards with two feet together over a rope laying on the floor?

Sponge activities These activities teachers can use in an academic classroom when the children go "brain dead" and just look at the teacher with a blank stare while he is trying to teach.

Contrary to popular belief, moving and having fun does not need to be loud or noisy. That is a myth that has emerged from spectator sports.

To stimulate the children's brain and nervous system to increase their attention span, have them tip-toe around the room or crawl under the desks or slide sidewards or carefully walk backwards. After two or three minutes, they will be ready to sit down and concentrate.

Lay a jump rope on the floor and see how many times children can jump over it sidewards. Do not allow them to face the rope, jump over it, turn around to face it, and jump over it.

Swing a long rope back and forth like a cradle movement and have the child jump sidewards over it as it comes to him.

There is a possibility that the targeted children learn primarily through the kinesthetic (moving or tactile) mode of learning. Most classroom teachers teach through a combination of the visual mode (i.e., reading, videos, chalk board, bulletin boards, computers) and the auditory mode (i.e. lectures, class discussions, video tapes).

Asking kinesthetic oriented children to forfeit the kinesthetic mode of learning is equivalent to asking a visual learner to spend each school day wearing a blind fold.

An alternative to using verbal directions continuously, would be to make command signs and teach the children to say each letter out loud, to say the command word, and to immediately do the movement. Over, under, around, and through the rows, desks, doors, hallways, books, etc., are some of the children's favorite reading movements.

Allow the targeted participants to walk while reading, or squeeze a small ball with their dominant hand while reading. Some times these simple movements just prior and during oral reading will help the child's dominant hemisphere to become alert and the corpus callosum to become active in communicating information stored in each hemisphere to the dominant hemisphere so that the knowledge can be acted upon.

What should academic classroom teachers look for? -- II

Children whom teachers are concerned about can not work in the space over their heads with both hands at the same time.

Manipulative skills

Developmental hand dominance process --

Birth -- 6 years old children should be encouraged to try all manipulative skills, i.e., write, throw, strike, cut, paste, with each hand. This can best be accomplished by handing or setting all objects at the child's midline. Between the ages of five and seven, one hand should begin to feel more comfortable manipulating all the objects.

(1) Encourage children to use two hands in the space over their head when hitting a balloon, jumping up to touch a ball suspended from the ceiling, or clapping hands, etc.

Use movement activities that encourage the child to be active as opposed to activities that emphasize the play object being active while the child remains inactive.

(2) Always make a practice of setting any object that you want the child to pick up in the middle of the desk, high chair or table. Allow the child to choose which hand to use to pick it up.

Too many of the children are subconsciously encouraged to be right handed because they are continuously handed things to their right hand because of our right handed society. When they enter physical education classes and are ask to throw a ball, etc., they often naturally prefer their left hand. Then we have a problem. Do we allow them to use their left hand to throw, etc., or do we try to match the writing hand?

(3) Always take notice of which hand a child uses to eat, write, cut, throw, and hit with. Does the hand differ for different activities?

(4) Instead of "grading" or evaluating what a child puts on a paper or how a child reads, take time to observe what part of the paper-space does a child use when drawing or writing? Is it the same area of a book page that she can point out words or pictures?

What is the position of the paper or book on the desk, table, or lap? Is it in the middle of the desk or extremely to the right or left side of the desk?

If the paper or book is placed in the center of the desk, does the child switch the crayon or pencil from the left hand to the right hand at the vertical middle of the page? Does he change the pointer finger to the opposite hand in the vertical middle of the page?

(5) Observe how a child sits on the floor. Is the sitting position with legs crossed or a "**W**" shape sitting position? The "**W**" sit is not crossing the midline.

(6) Always demonstrate writing lessons left handed for left handed children. Physical educators are taught to always demonstrate skills for children of right dominance and left dominance. Classroom teachers are not encouraged to demonstrate writing skills for both the right and left dominance. A teacher should not be concerned if she can not print, write, or cut well with her non dominant hand. The child's brain will fill in the inadequacies of the attempt much easier than it can reverse and turn your dominant demonstration to the child's dominant preference. Standing behind the student and helping her pattern the desired movement with her dominant hand is helpful to the child.

(7) Sit in front of a child reading and observe if the eyes are tracking left to right and resetting right to left, or if the child moves his entire head, or moves the book instead of his eyes. Some children have 20/20 vision reports on health screenings but their eye muscles do not tract across a page.

Like any other muscles, if they are not used, the eye muscles atrophy, until used and exercised daily. I believe the large amount of time

the children watch television and play video games, have caused the children to stare straight ahead and try to read what is in the area of focus without moving their eyes.

Developmental eye dominance process -- spying through a tube:

3-5 years old children may place tube between eyes

3-6 years old children may place tube over the eye opposite hand dominance

5-7 years old children, hopefully, have made the transition of placing tube over the eye on the same side of the body as their dominant hand.

Sponge activities Exercising the brain and nervous system can be done numerous times during the day.

(1) When sitting on the floor, encourage all children to sit "criss-cross applesauce" with their legs and to cross or fold their arms.

(2) Teach the children as many hand jives as can be found. Some old timers are patti cake and peas porridge hot. Have the children sitting on the floor, criss cross applesauce when learning a new hand jive. This releases the brain from having to remember to keep the children standing up. Whether we acknowledge it or not, the brain is constantly working to maintain body positions.

(3) Light weight juggling scarves, brightly colored ribbons, and/or crepe paper are wonderful props for developing right and left side use. Ask the child to throw the object up and across the body with one hand and catch straight down with the other hand, like a cat clawing down. Repeat the activity with the other hand throwing the object up and across the body.

Because of the lightness of juggling scarves, it is best to hold the scarf in the middle and make a ghost. Then "flick" the scarf up with the back of the hand moving towards the ceiling.

(4) Give each child two of the objects used in number 3 and have them practice big arm swings while walking, skipping, etc., around the room quietly. Remember to challenge the children to move forward, backward and sideward with large arm swings.

(5) Development dot to dot papers that work on the sequences of numbers or letters. Always begin the sequence in the upper left hand corner of the paper and always teach the crossing of the paper left to right, right to left, and from top to bottom.

(6) Use the pointer finger or a button on a string to exercise the eye muscles. Move it from left to right, right to left, up and down, and toward the face and away from the face. Make sure only the eyes are moving, not the head or body.

(7) Teach two children to turn a jump rope with no one jumping. Make certain that the children face each other. If one child has the rope handle in his right hand, the other child should have the rope handle in his left hand. This is very important and often overlooked.

Tell the children to turn the rope out and up and to touch their nose with their thumb on the way down. If the child can do this circular movement, he is crossing the sagittal midline. On the other hand, if the child is turning the rope in such a direction that his thumb looks as it could go up his nose, he is not crossing his midline. Have the children switch hands and repeat the turn, out -- away from the body, up, and down in front of the face to touch thumb to the nose on the way down -- not up.

The children will try to place the rope handle in their dominant hand

all the time. I tell my students that both arms want a turn to play and if one hand feels better turning the rope, the other hand just needs more practice.

(8) Give each child lined paper and have the children place the paper in the middle of the desk with the appropriate slant. Begin in the upper left corner and for right handed children make a connected series of circles in a counterclockwise direction completely across the paper. Left handed children would make the circles in a clockwise direction from the upper left hand corner to the upper right hand corner of the paper..

(9) Wad up some newspaper into balls and have the children practice catching the "ball" out in front of their body with two hands. Suggest to the children that the "ball" is peanut butter and their hands are two pieces of bread. Tell them to make a sandwich with their hands and the ball. Ask them if they got the peanut butter on their shirt, etc. This method teaches the children to catch away from their bodies rather than the basket catch.

Recommendations for further research

(1) If young children do develop their brain and nervous system through moving and doing, shouldn't educators begin to work more closely with the field of Developmental Neuropsychology? Couldn't we develop teaching methods to reach these few "mystery" children in the academic classrooms, if we could understand how their nervous system is developing?

(2) The results of this longitudinal study suggests the need for further research concentrating on one midline at a time. It would be interesting to collaborate with experts in brain imaging procedures.

Some work on brain imaging and reading has been done by Michael Posner at the University of Oregon. There is, also, an interesting study involving reading and brain imaging by Stanislas Dehaene, Institute of Cognitive and Decision Sciences, at the University of Oregon.

I am not aware of any method of performing brain imaging on children during movement activities. If a method is available to locate active areas of the brain during various modes of movement, it would be interesting to compare the results with the active brain areas while reading.

(3) This study documents the need for learning rooms in the schools and in the homes where children can safely risk to learn? Further study of what messages your parents and faculty members send to young children about learning developmental motor skills is needed.?

Do they hear:

•Don't run in the house!

•Don't play ball in the house!

•Go outside if you are going to rough house!

•Oh, be careful or you will fall down and get hurt!

•Big boys don't cry.

•Girls don't do that.

•Big kids don't act like that.

•Only babies move on their hands and knees!

Make every movement an adventure in learning.

References

Ayres, A. Jean (1994). Sensory integration and the child. (11th Ed.) Los Angeles: Western Psychological Services.

Ayres, A. Jean (1989). Sensory integration and learning disorders. (9th Ed.) Los Angeles: Western Psychological Services.

Barbour, Nita H. & Seefeldt, Carol (1993). Developmental continuity across preschool and primary grades. Wheaton, MD: Association for Childhood Education International.

Corso, Marjorie E. (1994). Developmental large motor and fine motor levels and academic classroom learning levels of children aged 5 to 12: A longitudinal research study. Fifth year of collecting data. Unpublished.

Coulter, Dee Joy. *Music and the making of mind.* Early Childhood Connections. 1995, Winter.

Delacato, Carl H. (1992). A new start for the child with reading problems: A manual for parents. Morton, PA: Morton Books.

Dennison, Paul E. (1981). Switching on: The holistic answer to dyslexia. (3rd Ed.) Ventura, CA: Edu-Kinesthetics, Inc.

Developmentally appropriate physical education practices for children. COPEC, (1992). A position statement of the Council on Physical Education for Children. Reston, VA: NASPE.

Developmentally appropriate practices in movement programs for young children ages 3-5, (1994). A National Association of Sport and Physical Education (NASPE) position statement. Reston, VA.

Gallahue, David L. (1993). Developmental physical education for today's children. (2nd Ed.) Indianapolis: Brown & Benchmark.

Haywood, Kathleen M. (1993). Life span motor development. (2nd Ed). Champaign, IL: Human Kinetics.

Heller, Wendy. *Of one mind.* The Sciences. 1990, May, v30(n3) p.38.

Heller, Wendy. *Hemispatial biases in children on the draw-a-person test.* Developmental Neuropsychology, 1991, 7(2), 151-160.

Heller, W., Terry, E.F.J., & Leventhal, B.L. *Inverted posture in right-handers is associated with relative deficits in visuospatial and visuomotor skills.* Neuropsychiatry, Neuropsychology, & Behavioral Neurology 1991 Vol. 4, n 3, pp. 175-192.

Klein, Marsha Dunn (1990). Pre-writing skills. Tucson: Communication Skills Builders, Inc.

Marcon, Rebecca A. *Linking research and policy reform in the District of Columbia Public Schools.* Young Children. November, 1994. National Association for the Education of Young Children (NAEYC)

Physical education: Preparing students to be active for life. Curriculum Update. Fall, 1996 Alexandria, VA: Association for Supervision and Curriculum Development.

Spock, Benjamin & Rothenberg, Michael B. (1992). Dr. Spock's baby and child care. (6th Ed.) New York: Simon & Schuster.

Stein, John F. (1991). *Visuospatial sense, hemispheric asymmetry and dyslexia.* Vision and visual dyslexia. J.F. Stein, Ed. Boca Raton, FL: CRC Press.

Understanding the brain. Curriculum Update. 1995, Vol 37, n 7, Alexandria, VA: Association for Supervision and Curriculum Development.

Williams, Harriet G. (1983). Perceptual and motor development. Englewood Cliffs, NJ: Prentice-Hall.

Synopsis of Parts II, III, and IV.

Transverse Midline

Part II

2. The transverse midline divides the upper part of the body and the lower part of the body.

The parallel

The physical education teacher observes the children as having a problem coordinating their arms and legs in locomotor, manipulative, and nonlocomotor skills. They hurry through activity challenges that are uncomfortable to them. They are slow in transitions from one activity to another activity.

The classroom teachers see these children as not able to change from reading to writing or spelling and are very slow to get books and paper and pencils ready for lessons. The teachers often check the areas of organizational skills and/or work habits as needing improvement on the progress report cards.

The children's writing is very sloppy although the other subject areas are at grade level. They often use only the top part of the paper-space without any sign that the bottom half of the paper exists.

Frontal Midline

Part III

3. The frontal midline divides the body into front and back.

The parallel

The academic classroom teacher may see these children as continually trying to read or from the right side of the paper to the left. Some of these children can draw a happy face for the teacher upside down. When asked why they drew the happy face that way, the children will say that they wanted it to look at you.

Letter reversals are constantly present in these children's writings.

The physical educator sees these children as always preferring to move backwards. They find it much easier to move scooters backwards, to walk backwards on a balance beam, to stand in line backwards, and they have a tendency to try to go clockwise in a circle with the majority of the class is going counterclockwise.

Crossing All Three Midlines Automatically

Part IV

The physical educator observes the locomotor, manipulative, and nonlocomotor skills as performed in a mature motor pattern with little thought or effort.

The academic classroom teacher evaluates the children working above grade level with little effort.